

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A voice mail service system for a private switching system comprising:

a system matching circuit and a system matching section configured to couple to a private switching system, which is a system of higher rank, so as to interface all information in relation to a call and management of a call including call-related messages, exchanging voice messages, recording and reproduction of processed voice data and perform interfacing for communication between a control section and the private switching system, which is a system of higher rank;

a voice data memory to provide a voice mail function, and to store voice guide information in an address sector of a corresponding channel;

a voice and signal processor to store voice data of the extension subscriber in the voice data memory and retrieve it so that the voice data can be transmitted;

a communication controller to manage a state of each channel matching with the private switching system, which is a system of higher rank, process channel errors, and maintain and repair the channel and wherein the communication controller directly and automatically determines a busy or nonresponsive state of the subscriber in response to an incoming

communication from a terminal and transfers the call to the system matching circuit and system matching section; and

a control circuit to match with the private switching system, which is a system of higher rank, to control an operation for maintaining the voice mail function, wherein the voice and signal processor comprises:

a vocoder coupled to the private switching system and configured to compress and modulate voice signals;

a first high speed RAM to store an algorithm for a compression-modulation and a demodulation of the voice signals by the vocoder;

a first buffer to store the voice signal compressed and modulated by the vocoder and the voice signal outputted;

a first dual port RAM to maintain a smooth transmission and a smooth reception of the compressed and modulated voice signal, to be stored in the voice data memory and the voice signal outputted; and

a first interface circuit coupled to the vocoder and the first dual port RAM, so as to arbitrate and control occupations of a system interface bus by the vocoder and the first dual port RAM.

2. (Original) The system of claim 1, wherein the voice mail service system is a line card, configured to couple to the private switching system.

3. (Original) The system of claim 2, wherein the line card accommodates a prescribed number of extension subscribers, and wherein an increase in a number of line cards can increase a number of extension subscribers capable of being served with the voice mail service.

4. (Previously Presented) The system of claim 1, wherein the system matching circuit comprises:

an interface section to interface with the private switching system;

a buffer to store data transmitted to and received from the private switching system in a prescribed protocol; and

a memory to store call-related messages and data transmitted or received between the private switching system and the control circuit.

5. (Previously Presented) The system of claim 1, wherein the voice data memory has a prescribed storage capacity, which is expandable.

6. (Currently Amended) The system of claim 1, wherein ~~the voice and signal processor comprises:~~

~~a vocoder coupled to the private switching system through a PCM highway and a system interface bus, configured to compress and modulate PCM voice signals;~~

~~a first high speed RAM to store an algorithm for a compression modulation and a demodulation of the PCM voice signals by the vocoder;~~

~~a first buffer to store the PCM voice signal compressed and modulated by the vocoder and the PCM voice signal outputted;~~

~~a first dual port RAM to maintain a smooth transmission and a smooth reception of the compressed and modulated PCM voice signal, to be stored in the voice data memory and the PCM voice signal outputted; and~~

~~a first interface circuit coupled to the vocoder and the first dual port RAM, so as to arbitrate and control occupations of system interface bus by the vocoder and the first dual port RAM~~ the voice signals comprise PCM voice signals.

7. (Currently Amended) The system of claim [[6]] 1, wherein the voice and signal processor further comprises:

a Dual Tone Multi-Frequency (DTMF) processor to process and analyze DTMF signals received from a terminal of the extension subscriber or a caller side terminal;

a second high speed RAM to store an algorithm for an operation of the DTMF processor;

a second buffer to temporarily store analyzed DTMF signals;

a second dual port RAM to prevent a collision between the analyzed DTMF signals and the DTMF signals; and

a second interface circuit coupled to the DTMF processor section and the second dual port RAM, to arbitrate and control the occupation of a system interface bus.

8. (Original) The system of claim 7, wherein the first and the second dual port RAMs respectively comprise banks of memory, each of which store voice data to provide the voice mail service and a registration for the voice mail service.

9. (Currently Amended) The system of claim 7, wherein data transmission/reception between the vocoder and the DTMF processor is carried out through ~~[[the]]~~ a PCM highway, and is controlled by the control circuit.

10. (Original) The system of claim 6, wherein the first and the second dual port RAMs respectively comprise banks of memory, each of which store voice data to provide the voice mail service and a registration for the voice mail service.

11. (Currently Amended) The system of claim 6, wherein data transmission/reception between the vocoder and the DTMF processor is carried out through ~~[[the]]~~ a PCM highway, and is controlled by the control circuit.

12. (Currently Amended) ~~The system of claim 1,~~ A voice mail service system for a private switching system comprising:

a system matching circuit and a system matching section configured to couple to a private switching system, which is a system of higher rank, so as to interface all information in relation to a call and management of a call including call-related messages, exchanging voice messages, recording and reproduction of processed voice data and perform interfacing for communication between a control section and the private switching system, which is a system of higher rank;

a voice data memory to provide a voice mail function, and to store voice guide information in an address sector of a corresponding channel;

a voice and signal processor to store voice data of the extension subscriber in the voice data memory and retrieve it so that the voice data can be transmitted;

a communication controller to manage a state of each channel matching with the private switching system, which is a system of higher rank, process channel errors, and maintain and repair the channel and wherein the communication controller directly and automatically determines a busy or nonresponsive state of the subscriber in response to an incoming communication from a terminal and transfers the call to the system matching circuit and system matching section; and

a control circuit to match with the private switching system, which is a system of higher rank, to control an operation for maintaining the voice mail function, wherein the voice and signal processor ~~further~~ comprises:

a Dual Tone Multi-Frequency (DTMF) processor to process and analyze DTMF signals received from a terminal of the extension subscriber or a caller side terminal;

a high speed RAM to store an algorithm for an operation of the DTMF processor;

a buffer to temporarily store analyzed DTMF signals;

a dual port RAM to prevent a collision between the analyzed DTMF signals and the DTMF signals; and

[[a]] an interface circuit coupled to the DTMF processor section and the dual port RAM, to arbitrate and control the occupation of a system interface bus.

13. (Original) The system of claim 1, wherein the voice memory provides the voice mail to each extension subscriber of the private switching system and stores voice guide information of the extension subscriber, and wherein the voice and signal processor stores voice data of the extension subscriber to transmit to an incoming caller.

14. (Original) The system of claim 2, wherein the connection to the private switching system is over a parallel bus.

15. (Original) The system of claim 4, wherein the private switching system is a system of higher rank than the voice mail system.

16. (Original) The system of claim 6, wherein the vocoder is coupled to the private switching network over a PCM highway and a system interface bus, and wherein the PCM voice signals are from an extension subscriber and are received over the PCM highway from the private switching system and are arranged for a recording in order to provide the voice mail service, the vocoder demodulating the compressed and modulated PCM voice signals to transmit the PCM voice signals to a caller side having applied an incoming call.

17-18. (Canceled)

19. (Original) The system of claim 1, wherein the voice and signal processor compresses the voice data prior to it being stored, and decompresses the compressed voice data prior to it being transmitted.

20. (Previously Presented) The method of claim 1, wherein the data memory, the system matching section, the control section, and the signal processor comprise a line card for providing the message service for the network.

21. (Previously Presented) The method of claim 1, wherein the subscriber's message is compressed prior to being set in the data memory, and is decompressed prior to transmitting to the terminal.

22. (Previously Presented) The method of claim 1, wherein the network is a private switching system and the message is a voice message.

23. (Original) The method of claim 22, wherein the signal processor includes a voice processor, and the voice message is transmitted to the terminal through a vocoder.

24. (Original) The method of claim 23, wherein the voice message service is provided to the private switching system through a line card of the private switching system.

25. (Canceled)

26. (Previously Presented) The system of claim 1, wherein the voice guide information is compressed prior to storage.

27. (Previously Presented) The system of claim 4, wherein the memory is a common memory.

28. (Previously Presented) The system of claim 5, wherein the voice data memory is configured to be expanded by a unit of memory bank.

29. (Currently Amended) ~~The system of claim 1,~~ A voice mail service system for a private switching system comprising:

a system matching circuit and a system matching section configured to couple to a private switching system, which is a system of higher rank, so as to interface all information in relation to a call and management of a call including call-related messages, exchanging voice messages, recording and reproduction of processed voice data and perform interfacing for communication between a control section and the private switching system, which is a system of higher rank;

a voice data memory to provide a voice mail function, and to store voice guide information in an address sector of a corresponding channel;

a voice and signal processor to store voice data of the extension subscriber in the voice data memory and retrieve it so that the voice data can be transmitted;

a communication controller to manage a state of each channel matching with the private switching system, which is a system of higher rank, process channel errors, and maintain and repair the channel and wherein the communication controller directly and automatically determines a busy or nonresponsive state of the subscriber in response to an incoming

communication from a terminal and transfers the call to the system matching circuit and system matching section; and

a control circuit to match with the private switching system, which is a system of higher rank, to control an operation for maintaining the voice mail function, wherein the voice and signal processor comprises:

a vocoder coupled to the private switching system through a communication link and a system interface bus, configured to compress and modulate voice signals carried over the communication link;

a storage device to store an algorithm for a compression-modulation and a demodulation of the voice signals by the vocoder;

a first buffer to store the voice signal compressed and modulated by the vocoder and the voice signal outputted;

a first multiple access storage device to maintain a smooth transmission and a smooth reception of the compressed and modulated voice signal, to be stored in the voice data memory and the voice signal outputted; and

a first interface circuit coupled to the vocoder and the first multiple access storage device, so as to arbitrate and control occupations of the system interface bus by the vocoder and the first multiple access storage device.

30. (Previously Presented) The system of claim 29, wherein the voice and signal processor further comprises:

a Dual Tone Multi-Frequency (DTMF) processor to process and analyze DTMF signals received from a terminal of the extension subscriber or a caller side terminal;

a second storage device to store an algorithm for an operation of the DTMF processor;

a second buffer to temporarily store analyzed DTMF signals;

a second multiple access storage device to prevent a collision between the analyzed DTMF signals and the DTMF signals; and

a second interface circuit coupled to the DTMF processor section and the second multiple access storage device, to arbitrate and control the occupation of a system interface bus.

31. (Previously Presented) The system of claim 30, wherein the first and second multiple access storage devices respectively comprise banks of memory, each of which store voice data to provide voice mail service and a registration for the voice mail service.

32. (Canceled)

33. (Previously Presented) The system of claim 2, wherein the connection to the private switching system is over a serial bus.

Serial No. 09/658,134  
Reply to Office Action dated April 22, 2004

Docket No. HI-0014

34. (Canceled)